STUDIES ON THE SPIDER FAUNA IN MIXED SAL FOREST AREA OF CHANDRABANI, DEHRA DUN

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Introduction

Spiders are among the most diverse groups on earth, which received the seventh ranking in global diversity after the six largest insect orders. Among various arthropods, the spiders are known for their complete dependence on predation of small insects and arachnids (Coddington and Levi, 1991). A number of entomologists have acknowledged the importance of spiders as one of the major predators in regulating the pest of different crops (Patel and Pillai, 1988). Spiders have different sizes and colours, and can be located easily in different habitats. They may be found everywhere, on dry leaves on forest floor, tall grasses, underground caves, under bark, stones, logs, near water source, mountainous areas and inside human habitations. Some spiders dig holes in the ground, and make use of shallow holes for hiding. Many spiders prefer dark and shaded location with high humidity. All spiders possess spinnerets and produce silk, which is mainly composed of protein called fibroin. Spiders use the silk for various purposes. A web spider uses its silk to trap the prey. Spiders generally lay their eggs within a cocoon of silk. Poison glands are found in all spiders except members of two small families. These glands open by a pore near the tip of each cheliceral fang. The gland has cylindrical shape and layer of spirally arranged muscles produce the venom. Spiders use their venom to kill the prey and as means of defence. Spiders are avoided due to ignorance, fear and dislike towards them. Generally, it is believed that spiders are highly poisonous and harmful. Indeed, all spiders have poison glands but few of them are dangerous to man (Gajbe, 2004).

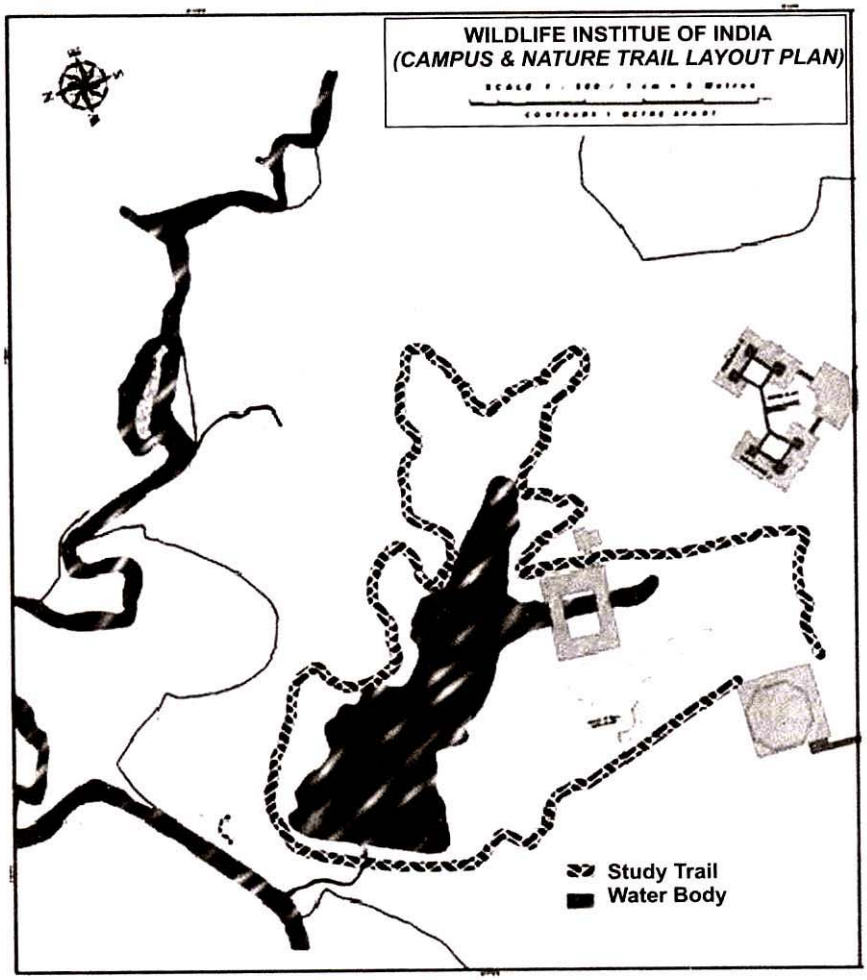
Studies on Indian spider fauna have been carried out by different workers (e.g. Tikadher, 1980; Sanyal and Tandon, 1998; Biswas and Biswas, 1992; Patel, 2002; Gajbe, 2004) in different regions of the country and documented 1,035 species belonging to 240 genera under 46 families from Indian subcontinent. Attempt was initiated to know the status of spider diversity in the sal forest habitat area of Wildlife Institute of India (WII) campus at Chandrabani, Dehra Dun.

Methods

Study site: The experiment was conducted in mixed deciduous Sal forest area of Chandrabani campus of WII during June to August 2004-2005. Sampling effort was carried out on each month and was concentrated mainly from February to April (dry season) 2004, and from June to August (rainy season) 2005. About 1.5 km trail along the lake with understory vegetation and litter area were chosen for collection site (Fig.1). Vegetation is mixed deciduous sal, dominated by *Shorea robusta*, *Sapium sebiferum*, *Xylosma longifolium*, *Morus alba*, *Mallotus*

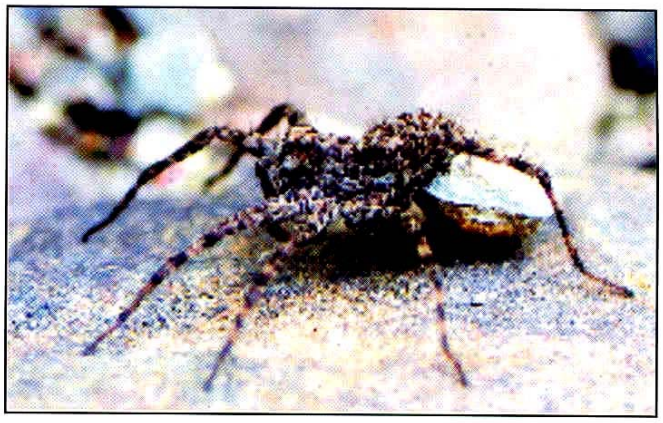
philippinensis and *Salix disperma* interspersed with dense shrubs species of *Clerodendrum infortunatum*, *Ficus palmata*, *Inula cappa*, *Lantana camara* and *Vitex negundo*. Grasses present are *Cymbopogon martini*, *Saccharum spontaneum* and *Vetiveria zizanioides*. Some abundant herbaceous species are *Ageratum conyzoides*, *Dioscorea bulbifera*, *Bidens pilosa*, *Calotropis procera*, *Centella asiatica*, *Ceratopteris thalictroides*, *Costus speciosus*, *Equisetum ramosissimum*, *Euphorbia emodi*, *Euphorbia hypericifolia*, *Parthenium hysterophorus*, *Polygonum barbatum* and *Sida cordifolia* which are very small and carpet the ground in some areas. Other common climber species on the study site are *Ampelocissus latifolia*, *Lygodium flexuosum* and *Mormodica dioica*.

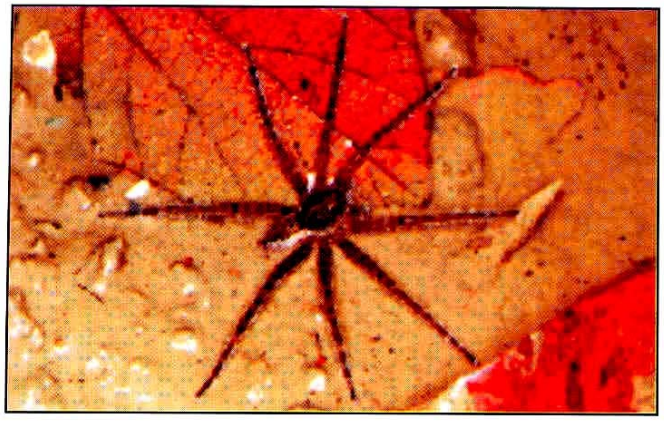
Fig. 1



Study Site

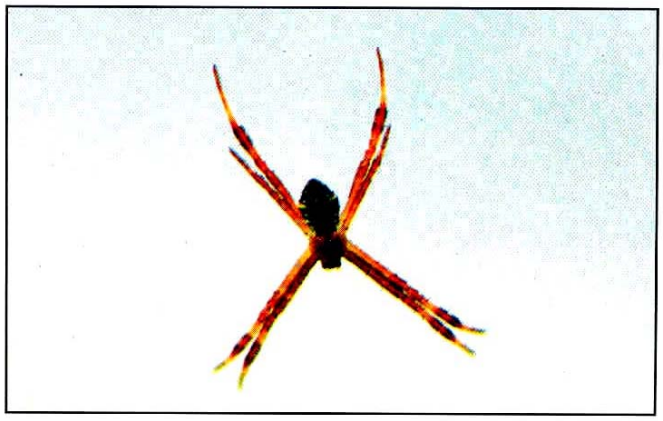
Pardosa birmanica Simon

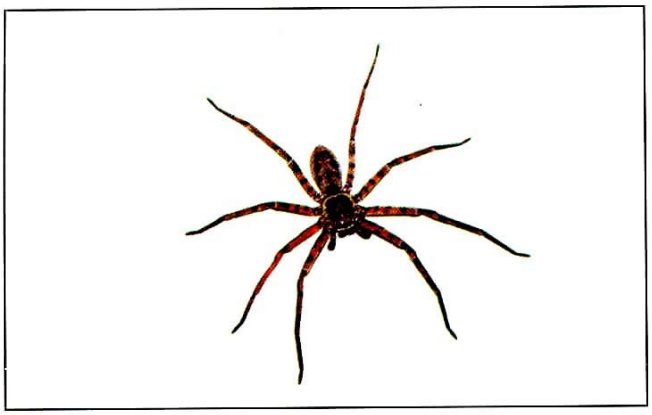




Trochosa himalayensis Tikader & Malhotra

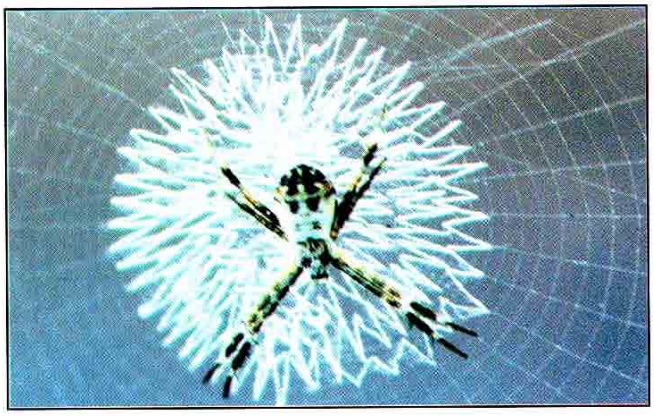
Argiope lobata Pallas





Heteropoda venatoria L.

Argiope trifasciata Forskal



Argiope sp

Sampling: Ground dwelling spiders were sampled using pit fall traps while other taxa were collected by sweep netting methods as suggested by Churchill and Ludwig (2004). Pitfall traps were used to access the ground active spiders visible on ground litter, low buttress, logs, and low ground vegetation. A total of 100 pitfalls were installed along both the side of 1 km trail with a regular interval of 20 m and were running for 7 days period of time. Pitfall samples from the same area were taken at intervals of atleast two weeks. Samples varied constant in number of trap-hours; total trap-hours were 2016. Each trap was consisted of a plastic container (diameter of opening 8 cm, 10 cm deep) with flush buried to the surface. The traps were one third filled with a solution of ethylene glycol, glacial acetic acid and detergent and were left open for a week. Spiders in herbaceous vegetation were sampled with a sweep net, by taking 100 sweeps while walking 100 paces parallel to trail of 1.5 km. Two 100-sweep samples were taken at each sampling time. Subsequent samples from the same area were taken at intervals of at least two weeks. The total number of 100 sweep samples was 24. Samples were collected weekly and returned to the laboratory for sorting and identification. Collected specimens were preserved in 70% alcohol. Identification was done using current taxonomic references.

Table 1

Spiders of the study area

Sl.No.	Family	Species
I	Araneidae	1. *Neoscona mukerjei* Tikader
		2. *Parawixia dehaanii* (Doleschall)
		3. *Gea corbetti* Tikader
		4. *Leucage decorata* (Blackwell)
		5. *Argiope pulchella* Thorell
		6. *Chorizopes* sp
II	Oxyopidae	7. *Oxyopes sikkimensis* Tikader
III	Lycosidae	8. *Hippasa pisaurina* Pocock
		9. *Lycosa* sp
		10. *Arctosa khudiensis* (Sinha)
		11. *Evippa rajasthaneus* Tikader & Malhotra
		12. *Evippa sohani* Tikader & Malhotra
IV	Thomisidae	13. *Philodromas* sp
		14. *Thomisus* sp
		15. *Runcinia* sp
V	Sparassidae	16. *Sparassus* sp
VI	Hetropodidae	17. *Heteropda* sp

Results

A total of 6 families comprising 16 genera and 17 species of spiders were identified and documented in the study area. Details are discussed below:

Family

(i) Araneidae: This group of spiders, popularly known as orb-weavers, is large to small sized, preferring habitat of tree trunk, thorny bushes, and small twigs. Lateral eyes which are located close together on the sides of the head are the prominent identifying character of the family Araniedae. A total of 6 species were recorded *viz. Neoscona mukerjei, Argiope pulchella, Parawixia dehaanii, Gea corbetti, Leucage decorate* and *Chorizopes* sp During the sampling *Nescona mukerjei* was found to be the most abundant species while *Parawixia dehaanii, Leucage decorate* and *Chorizopes* sp were much less abundant.

(ii) Oxyopidae: This group of spiders is hunting spiders and don't spin webs. They live mostly amongst grass and other plants .They are easily recognized by the long narrow conical abdomen, strongly spined body and raised head. *Oxyopes sikkimensis* is the only species found under this family although it represents the most abundant species in comparison to all other species belonging to different families recorded.

(iii) Lycosidae: Strictly ground dwellers, their cryptic colours camouflage them well in terrain. Most of them are nocturnal in nature. They have prominent eight eyes, unequal in size, all dark in colour with posterior row markedly recurved. A total of five species *viz Hippasa pisaurina, Lycosa* sp, *Arctosa khudiensis, Evippa rajasthaneus*, *Evippa sohani* having common occurrence under this family and sharing equivalent abundance were recorded.

(iv) Thomisidae: Small to medium sized spider, having a typical crab–like appearance due to the arrangement of their legs .Their preferred habitat is the blossoms of plants which they use to wait for prey. *Philodromas* sp, *Thomisus* sp, *Runcinia* sp species were found under this family but *Philodromas* sp was found to be most dominant.

(v) Sparassidae: Active hunters, build no webs and live amongst vegetation and on tree trunks. They have a straight or procurved posterior eye row. Laterals are of same size as medians. *Sparassus* sp is the single species found under this family and represents as singletons as well as rare species.

(vi) Heteropodidae: Large, dorso-ventrally flattened spider group with an almost round cephalothorax.. The eight eyes are arranged in a recurved posterior row and a procurved anterior row. The posterior lateral eyes are larger and prominent. *Heteropda* sp is the only prominent species recorded under this family.

Abundance of species with respect to number of individuals sampled during entire sampling period (Fig.2). This abundance profile showed the ranking of dominance of species with *Oxyopes sikkimensis* representing most abundant species while *Argiope pulchella, Sparassus* sp, *Runcinia* sp, *Parawixia dehaanii, Leucage decorate* and *Chorizopes* sp. showing least abundance. This abundance distribution curve qualifies the hypothesis of rarity which states that the probability encountered of rare species will always be more than the common species in any natural ecosystem.

Abundance of different spider families in respect to their individual numbers which prominently reflects Lycosidae and Oxyopidae as more abundant though less diverse family in comparison to Thomisidae and Araneidae (Fig.3). The probable reason we found behind that is

Fig. 2

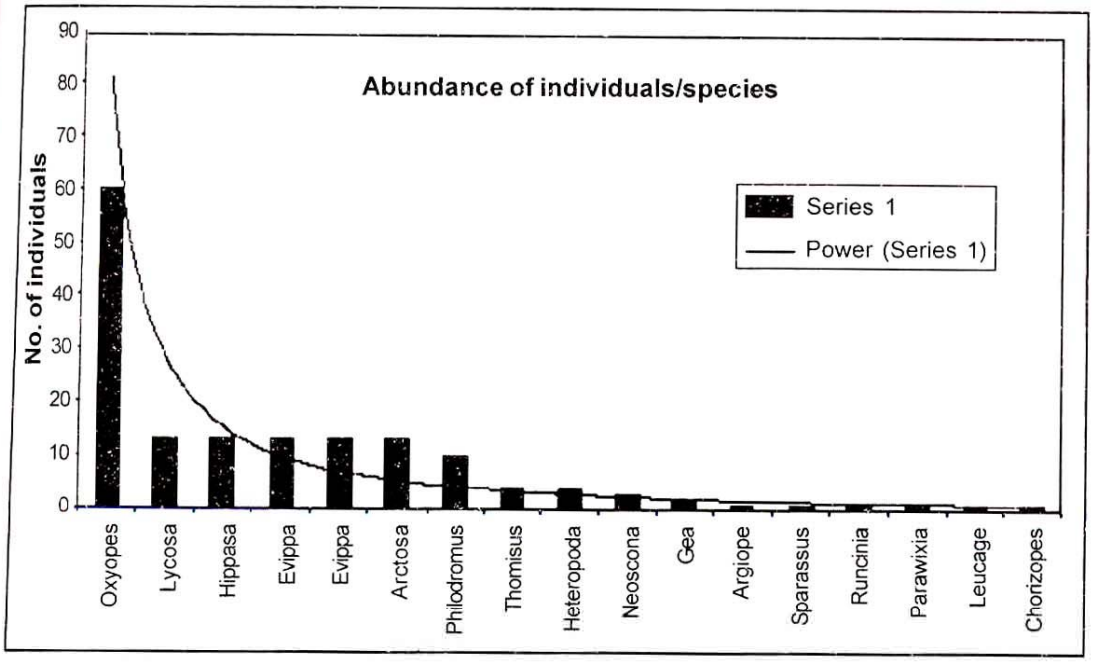
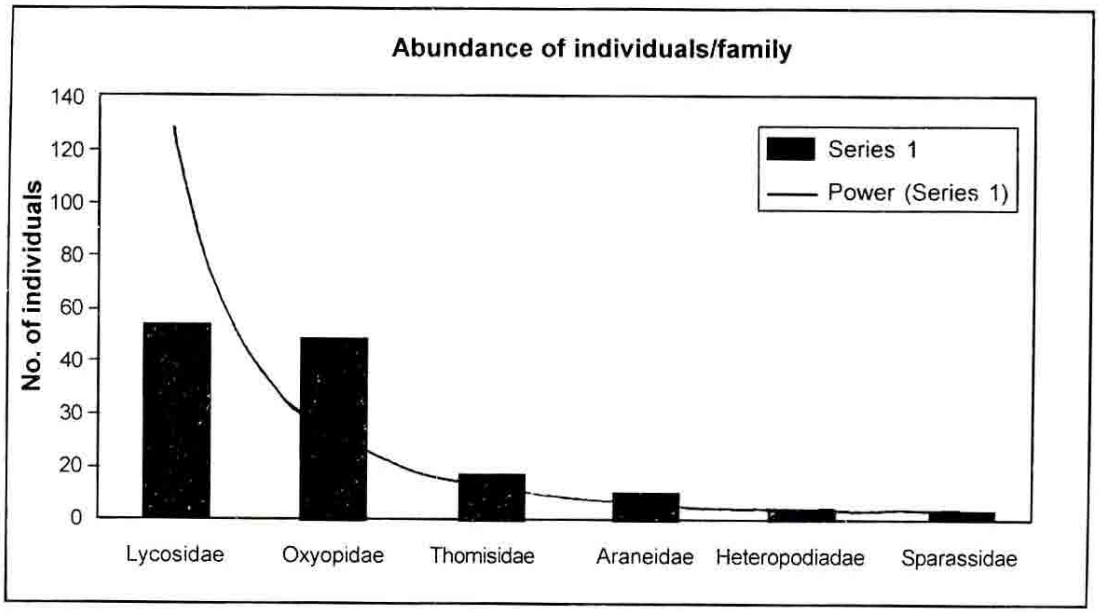

Abundance of individuals/species
No. of individuals
90
80
70
60
50
40
30
20
10
0
Series 1
Power (Series 1)
Oxyopes
Lycosa
Hippasa
Evippa
Evippa
Arctosa
Philodromus
Thomisus
Heteropoda
Neoscona
Gea
Argiope
Sparassus
Runcinia
Parawixia
Leucage
Chorizopes

Fig. 3


Abundance of individuals/family
No. of individuals
140
120
100
80
60
40
30
20
0
Series 1
Power (Series 1)
Lycosidae
Oxyopidae
Thomisidae
Araneidae
Heteropodiadae
Sparassidae

the habitat type itself. Since the habitat types represent mixed woodland and have higher variety of plants, it gives more opportunity to the web-builders, which in turn provides the spiders with more niches and communities to live in.

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SUMMARY

A preliminary survey of spider fauna in mixed sal forest in Chandrabani area of Dehra Dun was conducted during June to August 2004-2005. Altogether 17 spider species belonging to 16 genera and 6 families such as Araneidae, Oxyopiae, Lycosidae, Thomisidae, Sparassidae and Hetropodidae were collected from the forest floor.

चन्द्रबनी, देहरादून के मिश्र शाल वनों में मकड़ी जातों का अध्ययन

वी०पी० उनियाल व उपमन्यु होरे

सारांश

देहरादून के चन्द्रबनी क्षेत्र के मिश्र शाल वनों के मकड़ी जातों का एक प्रारम्भिक सर्वेक्षण जून से अगस्त 2004–2005 में किया गया। इस सर्वेक्षण में गोलवाय वंश, ऑक्सि ओपिई अनुवंश, लधुपर्णवंश, थोमिसिडी वंश, स्प्रास्सिडी वंश और विशयपाद वंश जैसे छह वंशों की 16 प्रजातियों में आती 17 मकड़ी जातियों वन तल से इकट्ठा की गई।

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